PEMBERTON DISTRICT

HANDBURN 101 1997

KARRI REGROWTH - NAIRN BLOCK

REPORT ON POST-FIRE ASSESSMENT OF FIRE DAMAGE

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INTRODUCTION

Handburn #101 in Nairn Block, Pemberton District was undertaken over the period spanning 14 and 15 January 1997 during which the Soil Dryness Index was between 900 and 950 (based on Manjimup SID data). Weather conditions and fire behaviour during burning operations were monitored by officers from the Fire Research Section at Manjimup. A summary of weather and fuel moisture observations is attached.

The burn included three age classes of karri regeneration: 1964, 1973 and 1975. As part of the ongoing program of operational research into development of prescribed burning techniques for regrowth stands, an assessment of fire damage was undertaken in September 1997 eight months after the burn.

METHOD

The area of 1975 regrowth was stratified into 3 categories of crown scorch:
- low (less than 30% of the green crown scorched),
- moderate (more than 30% but less than 100% scorch), and
- full scorch or defoliation.

Two transect lines were established within each crown scorch stratum, each transect being 4 metres wide and a minimum of 100 metres long. Transects contained at least 30 trees. Total height, scorch height and

the percentage of crown scorched were estimated for each tree. Diameter at breast height, and the width and height of old and new scars on each stem were measured.

The 1964 and 1973 regrowth was not sampled as part of the damage study because these stands were poorly stocked and had a large proportion of veteran trees still remaining.

RESULTS

The burn was located on a southerly aspect sloping down to Brook Rd (see attached map). Crown scorch was most evident in and around the area immediately east of Culvert Rd which contains patches of planted yellow stringy bark (*Eucalyptus muellerana*). It is likely that the rough fibrous bark which is a notable feature of this species encouraged flame extension up the stems of these trees and contributed to the high level of crown scorch. Crown scorch was least evident on the northern edge at the western end, at the south eastern corner, and along the southern edge at the western end.

Bole damage resulting from the fire was grouped into classes based on the area of bole affected, as follows:
- wounds 0 to 100 cm^2,
- wounds 100 to 1000 cm^2 , and
- wounds greater than 1000 cm^2 .

Additional classes for undamaged and dead trees were also recognised. The number of stems per hectare in each damage class was determined in 5 cm diameter classes and plotted in a histogram for each crown scorch stratum (see attached figures).

Key points to note about the histograms are as follows:

(1) The area subject to low scorch was more heavily stocked than the medium or fully scorched transects, most notably for trees greater than 30 cm diameter. The two transects in the medium scorch stratum were poorly stocked in all diameter size classes.

(2) In the low scorch area, tree mortality was confined to stems less than 15 cm in diameter which represent the suppressed component of the stand. In the fully scorched transects there was substantial

mortality of small trees (> 70% killed), together with some mortality of larger trees up to 35 cm diameter.

(3) The proportion of stems which remained undamaged following the fire also declined as the crown scorch level increased. Considering only the larger stems (>25 cm diameter) from which the selection would be made at first thinning, the stocking of undamaged trees was as follows:

low scorch - 350 stems/ha >25 cm undamaged,
moderate scorch - 200 stems/ha >25 cm undamaged,
full scorch - 117 stems/ha >25 cm undamaged.

It should be noted that the low stocking of undamaged potential crop trees in the moderate and full scorch classes is as much a reflection of poor initial stocking in these size classes as of the level of damage resulting from prescribed fire. Had the fire not taken place, the numbers of potential crop trees in the equivalent areas would have been 535 stems/ha, 310 stems/ha and 350 stems/ha respectively.

In estimating the stocking of potential crop trees available at first thinning it may be that some trees with small wounds can be retained without prejudice to the long term productive potential of the stand. Further studies of the development of wood decay in stems following wounding are needed to confirm this suggestion.

Conversely, selection of crop trees for retention at first thinning must also take account of considerations other than stem damage; these include spacing, form and crown vigour. The need to allow for these factors makes it important to keep stem damage from prescribed burning to the minimum possible level.

CONCLUSION

Based on the sample of trees from the low scorch area, it would be possible at the time of first thinning to leave a residual stand of 350 stems/ha of trees unaffected by fire damage. Assuming a mean diameter of 30 cm for retained trees, the equivalent basal area is 24.7 m^2/ha. The current Silvicultural Specification for karri thinning (1/92) recommends retention of 16 m^2/ha of potential crop trees for first

thinning at a top height of 30 m. Some latitude is therefore available to allow for selection of trees on the basis of form and spacing.

In the areas subject to higher levels of crown scorch it would not be possible to thin to the specified level of basal area without retaining some trees that had stem damage resulting from burning. The poorer stocking in these areas would have tended to make them less attractive for first thinning, even if prescribed burning had not been undertaken prior to thinning.

Two important points highlighted by the results of this survey are :

(1) that the success of prescribed burning in regrowth is strongly dependent on meeting target levels of fire intensity and crown scorch,

(2) future silvicultural flexibility will be much greater in uniformly well-stocked stands than in marginally or poorly-stocked stands.

PEMBERTON HANDBURN 101

WEATHER and FUEL MOISTURE READINGS 14 and 15 th JANUARY 1997

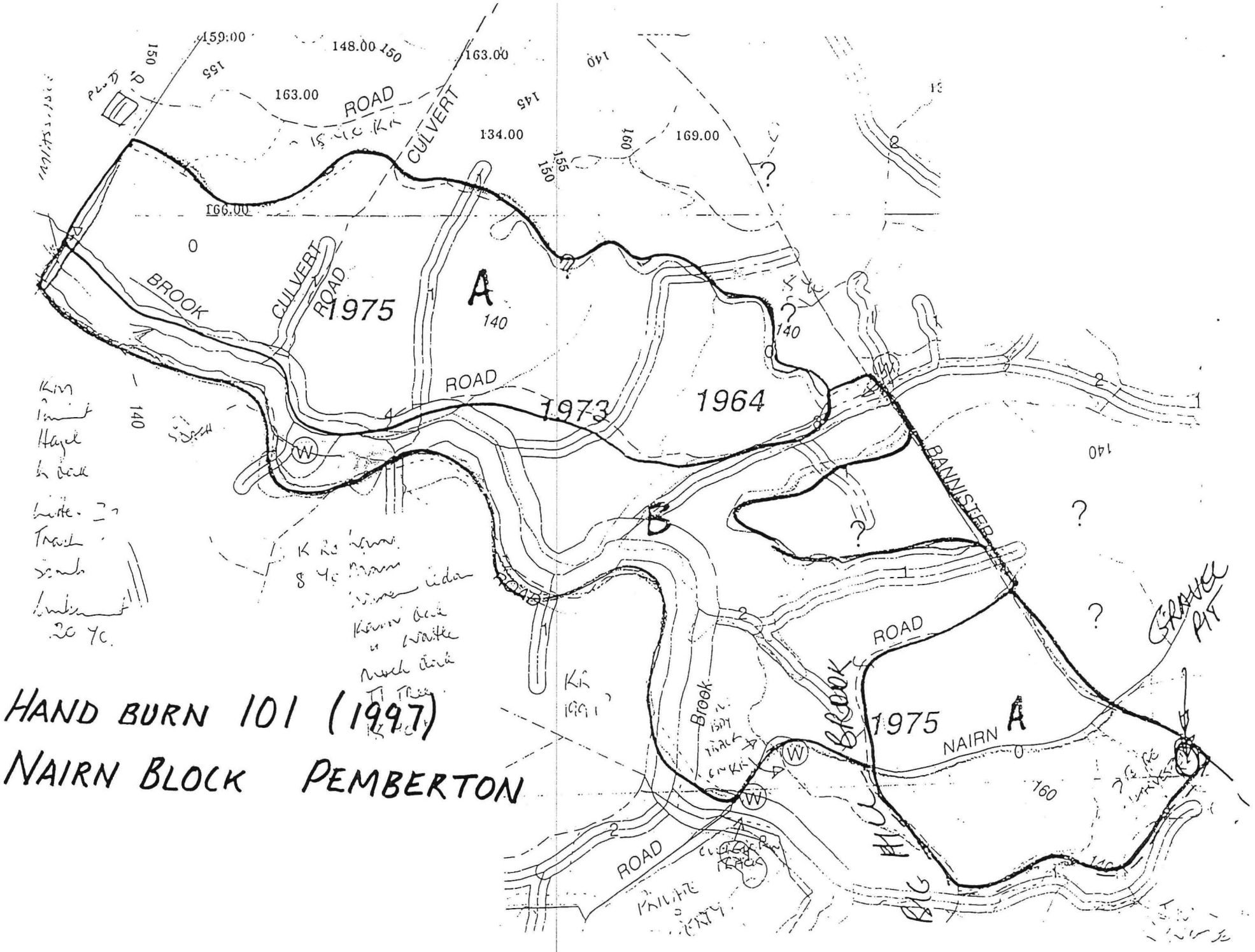
14/1/97

Place	Time	SMC	PMC	Air Temp. Deg. C	RH%	Backfire Flame Ht.	ROS
NW cnr.	1145	20.5	45.6	26	46%	0.8m	20 m/hr
BROOK Rd	1315	17.1	55.4	25	47%	1.0m	
CULVERT Rd	1600	19.6		27	50%	1.5m	20 m/hr
CULVERT Rd	1815	17.4		22	58%	1.5m	20m/hr

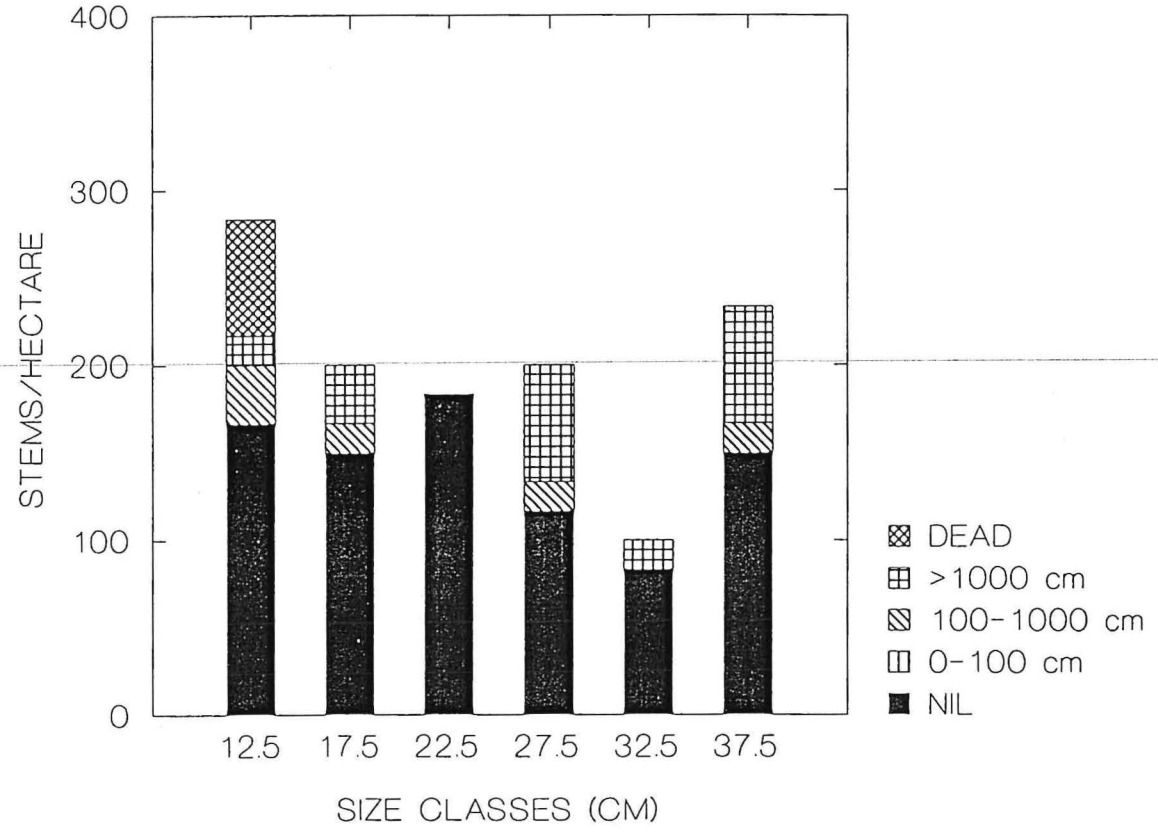
15/1/97

Place	Time	SMC	PMC	Air Temp. Deg. C	RH%	Backfire Flame Ht.	ROS
CULVERT Rd	1045	16.9	25.7	23	55	1.5m	20m/hr
BROOK Rd	1315	16.7	38.8	28	45	1.5m	20m/hr
BROOK Rd	1700	13.3	26.1	28	55	1.5m	20m/hr

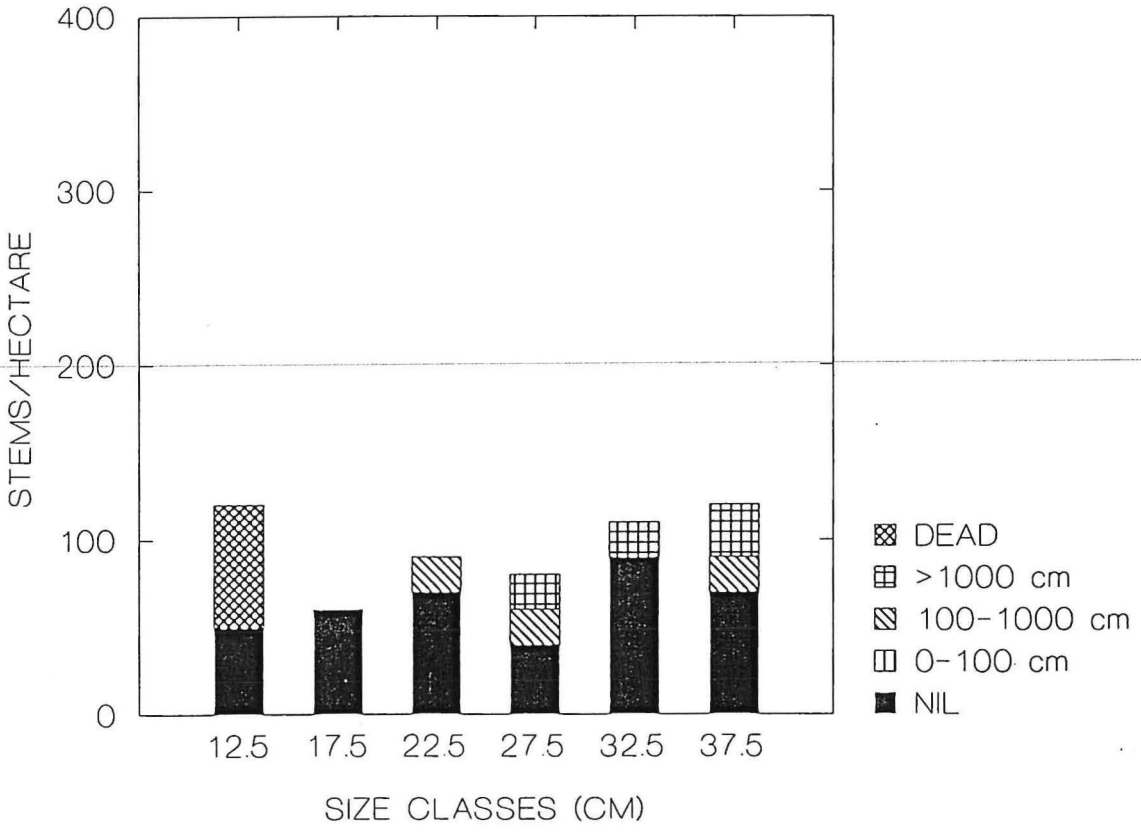
All weather readings taken beneath scrub canopy.


159.00
148.00
150
163.00
ROAD
CULVERT
134.00
169.00
166.00
BROOK
CULVERT
ROAD
1975
A
140
ROAD
1973
1964
BANNISTER
ROAD
ROAD
GRAVEL PIT
Brook
1975
A
NAIRN
760
ROAD
HAND BURN 101 (1997)
NAIRN BLOCK PEMBERTON

LOW SCORCH DAMAGE



MEDIUM SCORCH DAMAGE



HIGH SCORCH DAMAGE